

Catalogue of American Amphibians and Reptiles.

Williams, K.L. 1994. *Lampropeltis triangulum*.

***Lampropeltis triangulum* (Lacepède)**
Milk Snake

Coluber triangulum Lacepède, 1788:86. Type-locality, "America," restricted to the vicinity of New York City, New York (Schmidt, 1953). Holotype apparently non-existent.

Ablabes triangulum: Duméril, Bibron, and Duméril, 1854:315.

Lampropeltis triangula: Cope, 1861a:256.

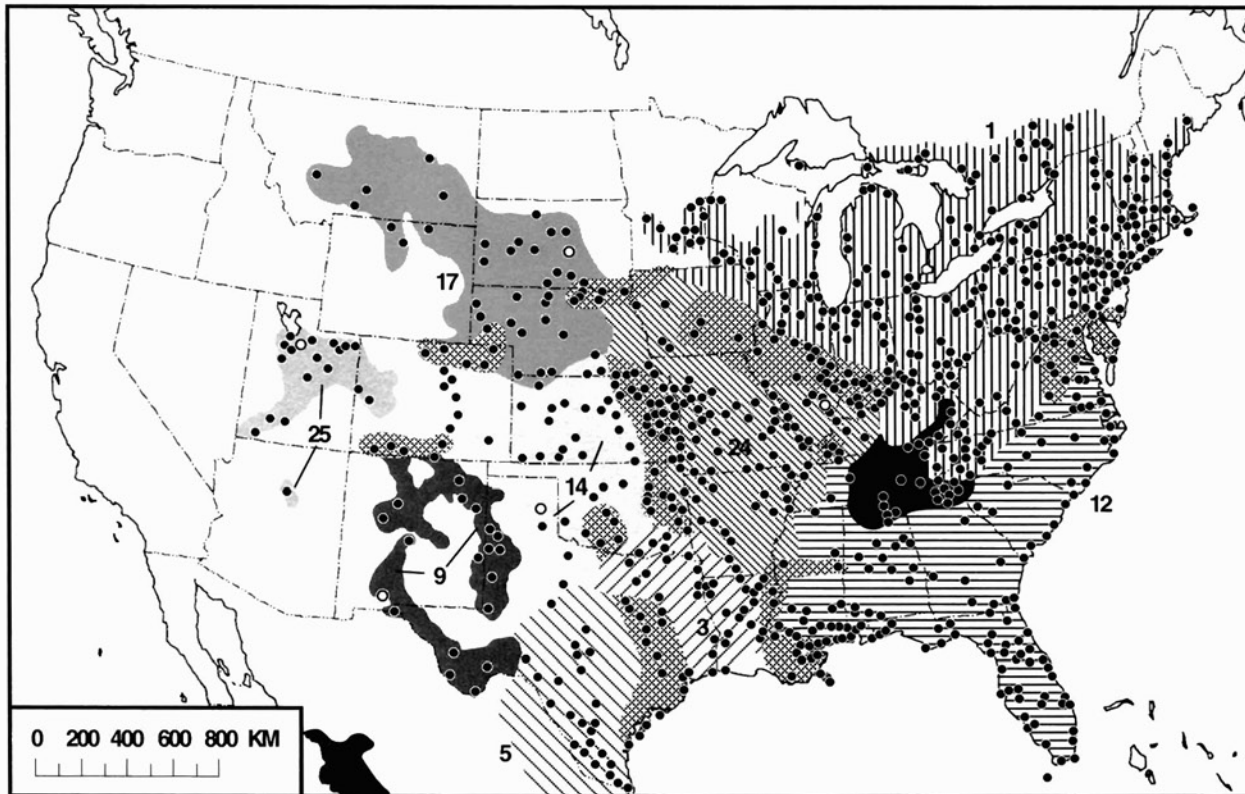
• **Content.** Twenty five subspecies are recognized: *triangulum*, *abnorma*, *amaura*, *andesiana*, *annulata*, *arcifera*, *blanchardi*,

campbelli, *celaenops*, *conanti*, *dixoni*, *elapsoides*, *gaigeae*, *gentilis*, *hondurensis*, *micropholis*, *multistrata*, *nelsoni*, *oligozona*, *polyzona*, *sinaloae*, *smithi*, *stuarti*, *syspila*, and *taylori* (but see Remark).

• **Definition.** A species of *Lampropeltis* with a body and tail color pattern consisting of rings or blotches involving the following sequence starting from the nape: yellow (or white), black, red (or orange, brown, or gray), black. If red (or equivalent) blotches are present, they are completely margined by black pigment, with pale pigment surrounding each blotch. The venter in blotched forms varies from an almost immaculate white to a checkerboard pattern of black and white rectangular markings. The red and white scales on the body and tail vary from having no black pigment on them to being nearly obscured by it. Dorsal scale rows normally range from 19-23 at midbody, reducing posteriorly (usually by fusion of rows 4 + 5) to 17 or 19. Supralabials usually are 7, infralabials 9. Preoculars usually



Figure. *Lampropeltis triangulum* from Jefferson County, Indiana (top) and from Okaloosa County, Florida (bottom). Photographs by Suzanne L. and Joseph T. Collins, The Center for North American Amphibians and Reptiles.



Map 1. Distribution of *Lampropeltis triangulum* in the United States. Type-localities are indicated by circles, other localities are marked with dots. Stars mark fossil localities. Overlapping ranges represent areas of intergradation; the darkly stippled area indicates a region of overlap without intergradation. The black area in western México indicates the range of a subspecies indicated on Map 2.

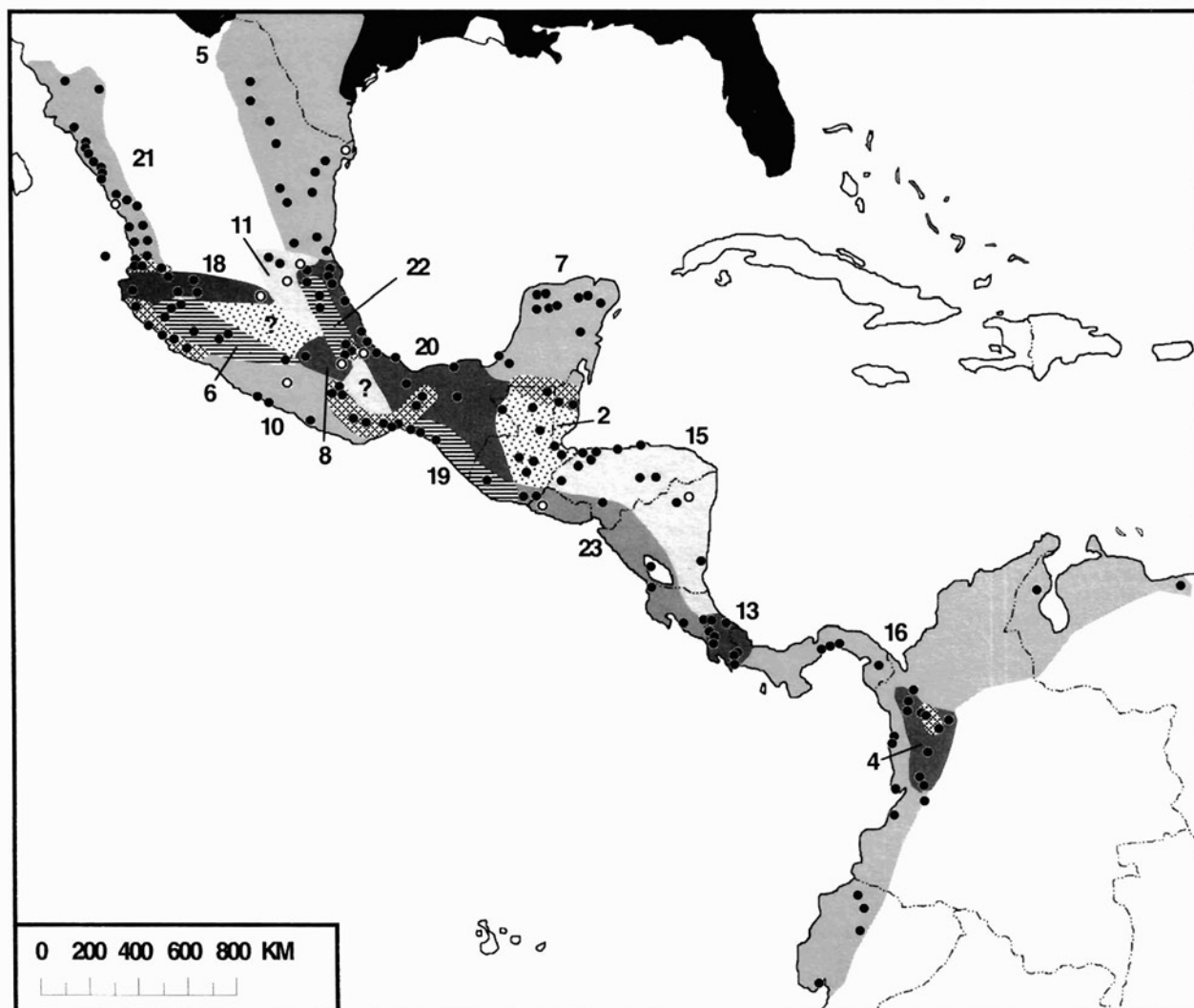
are 7, postoculars 2, loreals 1 (frequently absent in individuals from the southeastern United States). Temporals normally are 1 + 2 or 2 + 3. Ventrals in males range from 154-236, in females from 161-244; subcaudals in males from 32-63, in females from 31-60. Maxillary teeth range from 11-15, the last two are larger than those preceding them. Adult size varies geographically from small individuals (ca. 500 mm) inhabiting the southeastern United States to large individuals (1500-1900 mm) in southern México and Central America. The head shape in relation to body width varies from slightly distinct to distinct. Tail length averages about 13.5% of total length in males, 14.4% in females.

• **Diagnosis.** *Lampropeltis triangulum* differs from *L. ruthveni*, *L. mexicana*, and *L. alterna* in having the head less distinct from the body. In addition, this species differs from *L. ruthveni* (within the range of the latter) in having less uniform red rings, often obscured by black pigment middorsally. Another difference between *L. triangulum* on the one hand, and *L. ruthveni* and *L. mexicana* on the other, is that in the latter two the black rings are edged with a paler color (usually a pale lime green). *Lampropeltis ruthveni* has a lower ventral count (182-196) than sympatric *L. triangulum* (196-221). All members of the *mexicana* group tend to have considerable gray in the body colors, such is not so in *triangulum*, except some *triangulum* in the northeastern United States. *Lampropeltis triangulum* differs from *L. zonata* in that the white rings widen laterally in the former; from *L. pyromelana* in having a black, black and white, or red snout, rather than white. *Lampropeltis pyromelana* has 46-85 white rings on body, more than *L. triangulum* (10-32). Both *L. pyromelana* and *L. zonata* have a higher ventral scute number (213-238, and 194-227, respectively) than any of the adjacent western United States members of *L. triangulum* (174-208). *Lampropeltis triangulum* differs from both *L. calligaster* and *L. getula* in having an alternating pattern of white (yellow), red and black rings or blotches, the latter reaching the ventrals or nearly so, and in having the posterior two maxillary teeth longer and stouter than the preceding teeth.

• **Descriptions.** Williams (1988) provided detailed descriptions of all subspecies. Quinn (1983) named and gave detailed descriptions of *L. t. campbelli* and *L. t. dixonii*. Powell and Parmelee

(1981) described a color variant *L. t. blanchardi* from Quintana Roo, México, which was banded only over the posterior portion of the body. They also suggested that this pattern is in agreement with a possible trend (unpublished information) toward a uniform red coloration in populations in the northeastern portion of the Peninsula de Yucatán. Frank (1994) included a table listing characteristic patterns of all subspecies.

• **Illustrations.** Many photographs of this species have been published in state and regional guides and in a number of para-professional books and magazines; no useful purpose would be served by attempting to list them all. Williams (1988) provided color photographs of *abnorma*, *amaura*, *andesiana*, *annulata*, *arcifera*, *campbelli*, *celaenops*, *dixonii*, *elapsoides*, *gaigeae*, *gentilis*, *micropolis*, *multistrata*, *nelsoni*, *oligozona*, *polyzona*, *sinaloae*, *syspila*, *taylori*, and *triangulum*, as well as black and white drawings of head (dorsal, lateral, and ventral views) and body pattern of all subspecies. Quinn (1983) presented similar illustrations of the heads of *campbelli* and *dixonii*, as well as a black and white photograph of *campbelli*. Markel (1990) presented color illustrations of all subspecies. Applegate (1992) showed color photographs of *abnorma*, *amaura*, *annulata*, *arcifera*, *campbelli*, *celaenops*, *dixonii*, *elapsoides*, *gentilis*, *bondurensis* (reddish and tangerine phases), *sinaloae*, *syspila*, *syspila* x *triangulum* intergrade, *taylori*, and *triangulum*. Shaw and Campbell (1974) included a color photograph of *celaenops*. Linzey and Clifford (1981) presented color photographs of *elapsoides*, *triangulum*, and a *triangulum* x *elapsoides* intergrade (formerly "*temporalis*"). Englemann and Obst (1981) included color photographs of *arcifera*, *annulata*, *elapsoides*, *nelsoni*, and *triangulum*. Applegate (1992) contains color photographs of *abnorma*, *amaura*, *annulata*, *arcifera*, *campbelli*, *dixonii*, *elapsoides*, *gentilis*, *bondurensis*, *sinaloae*, *syspila*, and *taylori*. Frank (1994) presented color photographs of *abnorma*, *amaura*, *annulata*, *campbelli*, *elapsoides*, *gaigeae*, *bondurensis*, *multistrata*, *nelsoni*, *sinaloae*, *stuarti*, *syspila*, *taylori*, *triangulum*, and a *triangulum* x *elapsoides* intergrade (formerly "*temporalis*"). Tryon and Murphy (1982) included black-and-white photographs of *bondurensis* juveniles. Conant (1975) and Conant and Collins (1991) illustrated in color all the eastern and central United States subspecies. Stebbins (1985) included a colored illustration. Behler and King



Map 2. Distribution of *Lampropeltis triangulum* in México, Central America, and northern South America. Type-localities are indicated by circles, other localities are marked with dots. Overlapping ranges represent areas of intergradation. The black area is included in Map 1.

(1979) have color photographs of all United States subspecies. Smith and Brodie (1982) included color illustrations of *triangulum*, *elapsoides*, and *syspila*. Ashton and Ashton (1981) illustrated *elapsoides*, including both the common and yellow color phases. Vogt (1981) presented color photographs of juvenile and adult *triangulum*, as well as an adult with eggs. Kundert (1984) contains excellent color photographs of *annulata*, *arcifera*, and *nelsoni*. Wilson and Meyer (1985) presented *bondurensis* in color. Obst et al. (1988) included color photographs of *annulata*, *elapsoides*, *sinaloae*, *syspila*, and *triangulum*. Coborn (1991) included color photographs of *annulata*, *campbelli*, *elapsoides*, *gentilis*, *bondurensis*, *sinaloae*, *syspila*, and *triangulum*. Powell and Parmelee (1981) provided line drawings of a color variant of *blanchardi*. Additional illustrations are in numerous state and regional field guides.

• **Distribution.** *Lampropeltis triangulum* is one of the most widely distributed of all snake species, ranging from 48°N latitude to nearly 4°S latitude, a distance of almost 3600 airline miles. The species ranges from south-central and southeastern Ontario and southwestern Quebec southward throughout most of the United States east of the Rocky Mountains, northward through New Mexico, southern Colorado, and northern Arizona into the Great Basin in Utah, and southward into México, excluding most of the Chihuahuá Desert, all of the Sonoran Desert, and all of the Baja California Peninsula. The range continues southward through Central America into Colombia, Ecuador, and eastward into the Cordillera de la Costa of Venezuela.

The maps in this account were compiled primarily from Williams (1988) and updated from the following sources: Vermersch and

Kuntz (1986), Dixon (1987), Pérez-Santos and Moreno (1988, 1991), Lazell (1989), Dundee and Rossman (1989), Holman et al. (1989), Redmond et al. (1990), Roth and Smith (1990), Meade (1991), Pérez-Higareda and Smith (1991), Chiszar and Smith (1992), Mendoza Quijano and Rodríguez Yañez (1992), Sánchez-Hernández and Ramírez-Bautista (1992), Hunter et al. (1992), Collins (1993), and Blair et al. (1994). Mount (1975) gave precise localities for Alabama, including details on three subspecies whose ranges converge in the northern part of the state.

• **Fossil Record.** *Lampropeltis triangulum* has been recorded from the Pleistocene of Florida, Georgia, Kansas, Missouri, Texas, and Virginia; and the Pliocene of Kansas, Oklahoma, and Texas (sources are given in Williams, 1988). Meylan (1982) added another Florida Pleistocene record. Mead and Phillips (1981) recorded a Recent occurrence (2000 BP) in the Grand Canyon, Arizona.

• **Pertinent Literature.** Wright and Wright (1957) included information on descriptions and natural history of U.S. populations. The most recent and complete reviews of the species were those of Williams (1978, 1988). Greene (1979) reviewed Williams' (1978) monograph, and Frost and Hillis (1990) were highly critical of the taxonomic approach in Williams' study. Quinn (1983) described two new subspecies and presented descriptions, comparisons, and ecological and reproductive information. Garstka (1982) revived *L. rubveni* as a separate species; Williams (1978) had placed this organism in the synonymy of *L. t. arcifera*. Wilson and Meyer (1985) presented a different approach to the infraspecific taxa in this species, recognizing four subspecies rather than the 25 presented in this

account. They also presented, utilizing Williams' (1978) and Quinn's (1983) data, another interpretation of head and body pattern. Cox (1982) argued against considering *temporalis* a synonym of *triangulum*. Iverson (1977) suggested that Williams (1970) was in error in stating that *multistrata* has an orange snout, instead stating that the snout is light cream mottled with black and occasionally flecked with orange. Gillingham et al. (1977) presented data on courtship and copulatory behavior. Fitch (1981) commented on sexual size differences. Groves and Assetto (1976) gave information on egg laying in captivity. Barten (1981) reported on courting, egg laying and size, hatching, juvenile size, and shedding. Miller and Grall (1978) and Hermann (1979) gave information on copulation, egg laying and size, hatching, and size of hatchlings. Tryon and Murphy (1982) presented information for captive specimens on copulation, gestation period, egg size, neonate length and weight, and food items. Tryon and Hulsey (1976), Kardon (1979), Dloogatch and Zaremba (1981), and Frank (1994) reported on reproduction and/or propagation of captive specimens. Tryon (1984) and Michaels (1989) reported multiple clutches, and the latter also noted delayed fertilization in a captive colony. Whipple and Collins (1988) reported the first complete clutch record for *gentilis*. Henderson et al. (1980) presented a study of aggregating behavior and exploitation of subterranean habitat by gravid females. Carpenter and Ferguson (1977) summarized the literature on behavior. Mitchell and Groves (1993) reported oophagy in a specimen. Weldon et al. (1993) reported shed skin-eating in the species. Some information on habitat and ecology is provided by Fitch and Fleet (1970), Mount (1975), Lee (1980), Brown and Parker (1982), Campbell and Christman (1982a, b), Fitch (1982), Dyrkacz (1977), Campbell and Vannini (1989), Johnson (1989), and Gibbons and Semlitsch (1991). Gregory (1982) presented information on hibernation. Fitch (1992) provided information on the relative abundance and trapping methods for an eastern Kansas population. Dove et al. (1982) and Mautz (1982) discussed water loss. Avery (1982) summarized information on field body temperatures. Christman (1980) analyzed geographic variation patterns for Florida specimens. Mendoza Quijano and Rodriguez Yañez (1992) gave a maximum size record for female *smithi*. Greene and McDiarmid (1981) discussed mimicry. Dyrkacz (1981) and Blair et al. (1994) reported on albinistic specimens. Bowler (1977) and Rundquist (1981) gave data on longevity for eight subspecies. Saiff (1975) described the preglottal structure. Bechtel and Bechtel (1981) indicated the presence and position of iridophores in the dermis. Oldak (1976) showed differences in the scent gland lipids from those of closely related species. Gabe (1970) presented information on the adrenal gland, and Clark (1970) on the parathyroids. Price and Kelly (1989) gave a general description of the dorsal scale microdermatoglyphic pattern. Dowling and Maxon (1990) discussed relationship with *Stilosoma*. Applegate (1992) detailed general care and maintenance of captive milk snakes.

• **Remark.** Collins (1991) and Conant and Collins (1991) implied that this widely distributed taxon may constitute a species complex.

• **Etymology.** The name *triangulum* is derived from the Latin meaning "triangle," in reference to the shape of the anterior edge of the first blotch. The name *abnorma* is from the Latin meaning "deviating from the type," in apparent reference to its divergence from other members of the species. The name *amaura* is derived from the Greek word *amauros*, which means dark or dim, apparently in reference to the numerous black rings. The name *andesiana* is derived from the word Andes, in reference to the mountains in which the form occurs, plus the collective plural suffix *-iana*. The name *annulata* is from the Latin word *annularis*, which means "ringed or annular," and is in reference to the ringed or banded condition of the color pattern. The name *arcifera* is formed from the Latin *arcus*, meaning "arch," and the Latin *-fer*, meaning "to bear," apparently referring to the arch-like effect on the lateral aspects of the body caused by the black pigment crossing the red rings middorsally. The name *blanchardi* is a patronym honoring Frank N. Blanchard, an early and major contributor to the knowledge of the genus *Lampropeltis*. The name *campbelli* is a patronym honoring Jonathan A. Campbell, collector of most of the type series of this subspecies and "an ardent and competent field biologist." The name *celaenops* may be derived from the Greek word *celaeno*, which means "black or dark," and the ending *-ops*, meaning eye. The name *conanti* is a patronym honoring Roger Conant for his early work on *L. triangulum* and his many other contributions to North American herpetology.

The name *dixoni* is a patronym honoring James R. Dixon, "who has contributed greatly to our understanding of Mexican herpetology." The name *elapsoides* is derived from the Greek word *Elaps*, which in combination with the Greek *-oides* means "like or resembling", perhaps in reference to the similarity of this form with *Elaps* (= *Micrurus*). The name *gaigeae* is a patronym honoring Helen T. Gaige, who collected the type. The name *gentilis* is derived from the Latin, meaning "of the same race or clan", presumably in reference to its relationship to other members of the species. The name *bondurensis* is based on that of the country of Honduras, which encompasses a significant part of this subspecies' range. The name *micropholis* is derived from the Greek *mikros*, meaning "small," and the Greek *pholis*, meaning "scale", apparently in reference to the small dorsal scales of this form. The name *multistrata* is derived from the Latin *multus*, meaning "many," and the Latin *stratum*, meaning "layer," apparently in reference to the number of dorsal scale rows present. The name *nelsoni* is a patronym honoring W. W. Nelson, collector of the type, as well as many other important specimens from Mexico. The name *oligozona* is from the Latin words *oligos*, meaning "few," and *zonas*, meaning "zone," apparently referring to the low number of bands or rings that typifies this race. The name *polyzona* is formed from the Greek *polys*, meaning "many," and the Greek *zone*, meaning "a belt or girdle," apparently in reference to the high number of rings or bands typical of this subspecies. The name *sinaloae* is for the Mexican state of Sinaloa, which encompasses the major portion of the range of this form. The name *smithi* is a patronym honoring Hobart M. Smith for his early work on *L. triangulum* and for his many acts of aid and friendship to legions of herpetology students. The name *stuarti* is a patronym honoring L. C. Stuart for his important contributions to the herpetology of Guatemala, an area into which *stuarti* ranges. The name *syspila* is derived from the Greek *sys-*, meaning "together," and *pilus*, meaning "cap," apparently in reference to the similarity in snout (top of or "cap") pattern to that of others of the species. The name *taylori* is a patronym honoring Edward H. Taylor, designated "our friend and teacher" by describers.

1. *Lampropeltis triangulum triangulum* (Lacepède)

Coluber triangulum Lacepède, 1788:86. See species synonymy.
Pseudoeleaps Y Berthold, 1842: 23. Type-locality, "North America."
Holotype unknown.

Opibolus excimius: Baird and Girard, 1853:87. Williams (1971) considered this name a *nomen dubium*. McCoy (1972) considered this name a synonym of *L. triangulum triangulum*.

Opibolus clericus: Baird and Girard, 1853:88. Type-locality, "Clarke County, Virginia." Lectotype, National Museum of Natural History (USNM) 2380 (designated by Blanchard, 1921), an adult male, date of collection unknown, collected by C.B. Kennerly (examined by author). Williams (1978) considered the lectotype to be a *L. t. triangulum* x *L. t. elapsoides*.

Ablabes triangulum: Duméril, Bibron, and Duméril, 1854:315.

Lampropeltis triangula: Cope, 1861a:256.

Coronella exima: Jan, 1863:237.

Opibolus doliatus triangulus: Cope, 1875:37.

Opibolus doliatus clericus: Cope, 1888:383.

Opibolus doliatus collaris: Cope, 1888:383. Type-locality, "Elmira, Stark County, Illinois." Lectotype, National Museum of Natural History (USNM) 2433 (designated by Blanchard, 1921), an adult male, date of collection unknown, collected by E.R. Boardman (examined by the author).

Opibolus triangulus triangulus: Garman, 1892:295.

Coronella triangulum: Boulenger, 1894:200.

Opibolus doliatus temporalis: Cope, 1893:1068. Type-locality, "Delaware." Holotype, Academy of Natural Sciences of Philadelphia (ANSP) 3597, a male, age status and date of collection unknown, collected by Mr. Drexler (not examined by author). This specimen is a *L. t. triangulum* x *L. t. elapsoides* intergrade, *fide* Williams (1978).

Lampropeltis doliata triangula: McLain, 1899:3.

Osceola doliata triangula: Cope, 1900:885.

Osceola doliata collaris: Cope, 1900:887.

Osceola doliata clerica: Cope, 1900:888.

Lampropeltis doliatus collaris: Hay, 1902:90.

Lampropeltis doliatus clericus: Fowler, 1907:181.

Lampropeltis triangulum triangulum: Stejneger and Barbour, 1917:89.

• **Definition.** This subspecies is characterized by having the first blotch extending onto the head, forming a light colored "Y" or "V"

in its center (usually on nape). The body pattern consists of a dorsal row of large, black-bordered, gray or brown blotches (red in juveniles), usually extending to the 3rd or 4th scale row on each side, and a ventrolateral row (or two rows) of small, irregularly-shaped blotches on each side, alternating with the dorsal blotches. The dorsal body blotches range in number from 24-54 ($\bar{x}$ = 36.7). The ventral surface has rectangular black marks, often arranged in checkerboard pattern. Temporals are normally 2 + 3. The dorsal scale rows at midbody usually are 21.

2. *Lampropeltis triangulum abnorma* (Bocourt)

Coronella formosa anomala Bocourt, 1886:614 (see discussion of this name in Williams, 1978:208).

Coronella formosa abnorma Bocourt, 1886:pl. 39, figs. 4-4c. Substitute name for *Coronella formosa anomala* Bocourt, 1886. Type-locality, "Haute Vera Paz" (= Alta Verapaz, Guatemala). Holotype, Museum National d'Histoire Naturelle 88-129, an adult female, date of collection unknown, collected by M.F. Bocourt (examined by author).

Lampropeltis triangulum abnorma: Smith, 1942:201.

Lampropeltis doliata abnorma: Klauber, 1948:11.

• **Definition.** This subspecies is characterized by having a broad white band which usually crosses the posterior edge of the internasals and the anterior half of the prefrontals. The black pigment on the head extends from the white snout band to the posterior fourth of parietals and is complete across the venter. Red and white scales on the dorsum usually have distinct black tips. The red body rings range in number from 20-31 ($\bar{x}$ = 25.0). Temporals are usually 2 + 3. The dorsal scale rows usually are 23 or 21 at midbody.

3. *Lampropeltis triangulum amauro* Cope

Lampropeltis amauro Cope, 1861a:258. Type-locality, original entry of type reads "Mississippi," restricted by Schmidt (1953) to the vicinity of New Orleans, Louisiana. Williams (1978) suggested that the type-locality be considered as unknown, inasmuch as the characteristics of the holotype do not agree with data taken from specimens from New Orleans and vicinity. Holotype, National Museum of Natural History (USNM) 5282, an adult male, date of collection, and collector unknown (examined by author).

Ophibolus doliatus amauro: Cope, 1875:36.

Ophibolus doliatus parallelus Cope, 1888:385. Type-locality, originally listed as "Gainesville, Florida," is undoubtedly incorrect; see Blanchard (1921) for discussion of this probable error; the type-locality must be listed as unknown. Holotype, National Museum of Natural History (USNM) 10544, a young adult female, date and collector unknown (examined by author).

Osceola doliata parallela: Cope, 1900: 893.

Lampropeltis triangulum amauro: Stejneger and Barbour, 1917:90.

Lampropeltis doliata amauro: Klauber, 1948:11.

• **Definition.** This subspecies is characterized by having a black and white mottled snout. The remainder of the head usually is black. The red rings on the body are separated at the edge of ventrals by a black border on each side; the midventral area is white. The red rings are rarely separated or reduced middorsally by black pigment. The red body rings range in number from 13-24 ($\bar{x}$ = 16.2). The red and white scales are not black-tipped. Temporals usually are 2 + 2 or 2 + 3. The dorsal scale rows usually are 21 at midbody.

4. *Lampropeltis triangulum andesiana* Williams

Lampropeltis triangulum andesiana Williams, 1978:231. Type-locality, "the hills near Cali, Valle, Colombia." Holotype, National Museum of Natural History (USNM) 151732, an adult female collected in the fall of 1962, received by Dr. W.A. Thornton, collector unknown (examined by author).

• **Definition.** This subspecies is characterized by having a white snout with narrow, black margins on posterior edge of scales. The supralabials are white with black posterior margins. The remainder of the head has black pigment on most of the frontal, supraoculars, and anterior half of the parietals. The first black ring begins on the posterior portion of the parietals or less than one scale length posteriorly. The red scales are unmarked or slightly black-tipped.

The white scales are extensively black-tipped. The red body rings number from 24-37 ($\bar{x}$ = 30.7). Temporals usually are 2 + 3 (occasionally 1 + 2 or 2 + 2). The dorsal scale rows usually are 19 at midbody.

5. *Lampropeltis triangulum annulata* Kennicott

Lampropeltis annulata Kennicott, 1861:329. Type-locality, "Matamoros, Tamaulipas, Mexico." Holotype, Academy of Natural Sciences of Philadelphia (ANSP) 3613 (originally USNM 4239), collected by Lt. Couch (not examined by author).

Coronella doliata conjuncta Jan and Sordelli, 1865:livr. 14, pl. 6, fig. c. Type-locality, "Brazil," undoubtedly in error. Holotype destroyed.

Ophibolus doliatus annulatus: Yarrow, 1883:90.

Ophibolus triangulum annulatus: Garman, 1883 (1884):156.

Coronella annulata: Günther, 1893, in 1885-1902:109 (part).

Osceola doliata annulatus: Cope, 1900:895 (part).

Osceola doliata conjuncta: Cope, 1900:896.

Lampropeltis triangulum annulata: Blanchard, 1920b:5.

Lampropeltis doliata annulata: Klauber, 1948:11.

• **Definition.** This subspecies is characterized by having a black snout and head. The infralabials are mostly black; the remainder of the throat and chin are white with scattered black flecks. The red rings reach only the lower edge of the first scale row or to the edge of ventrals, being interrupted by black pigment, which completely crosses the ventral surface. The red and white scales are not black-tipped. The red body rings range in number from 14-22 ($\bar{x}$ = 17.6). Temporals normally are 2 + 3 or 2 + 2. The dorsal scale rows usually are 21 at midbody.

6. *Lampropeltis triangulum arcifera* Werner

Lampropeltis micropholis arcifera Werner, 1903:250. Type-locality, "Mexico." Williams (1978) considered the restriction to Necaxa, Puebla, México, by Smith and Taylor (1950) to be incorrect. Holotype, Institute Royal des Sciences Naturelles de Belgique 9.422, an adult female, date of collection and collector unknown (examined by author).

Lampropeltis triangulum arcifera: Smith, 1942:198 (part).

Lampropeltis arcifera: Engelmann and Obst, 1981:93.

• **Definition.** This subspecies is characterized by having a black snout with small amounts of white flecks on the nasals and loreals. The head is black posteriorly. The first black ring usually touches the angle of the jaw or is less than one scale long posteriorly and is complete in a broad straight band across the throat. The red and white scales are not black-tipped. The red body rings number from 19-31 ($\bar{x}$ = 21.9). The temporals usually are 2 + 3. The dorsal scale rows are 21 at midbody.

7. *Lampropeltis triangulum blanchardi* Stuart

Lampropeltis polyzona blanchardi Stuart, 1935c:2. Type-locality, "Valladolid Trail near Chichen Itzá, Yucatan, Mexico." Holotype, National Museum of Natural History (USNM) 68239, a young male collected 13 February 1930 by F.M. Gaige (examined by author).

Lampropeltis triangulum blanchardi: Dunn, 1937:8.

• **Definition.** This subspecies is characterized by having a black snout and head (pigment completely covering parietals). The chin is usually black. The first black ring frequently connects middorsally to black pigment on the parietal or begins one and one-half to two scale lengths posteriorly. The first black ring is complete ventrally, broadly crossing the throat on small anterior ventrals. The red scales are distinctly black-tipped. Black tipping may be present or absent on the white scales. The red body rings number from 14-21 ($\bar{x}$ = 17.1). Temporals usually are 2 + 3. The dorsal scale rows are 21-23 at midbody.

8. *Lampropeltis triangulum campbelli* Quinn

Lampropeltis triangulum campbelli Quinn, 1983:116. Type-locality, "4.8 km. S Zapotitlán, Puebla, México, elevation 1680 m." Holotype, University of Texas at Arlington Museum (UTAM) 4822, a juvenile male collected 23 August 1975 by J.A. Campbell (examined by author).

• **Definition.** This subspecies is characterized by having a black snout with white pigmentation forming a rather indistinct, mottled band that involves various portions of the internasals, most of the prefrontals, and the anterior edge of the frontal. The pale band curves across the frontal forming a "U". The red scales are not or only slightly black-tipped. The white scales are not black-tipped. The red rings on the body range from 14-22 ($\bar{x}$ = 16.8). About one-half of the red body bands are incomplete ventrally. The temporals normally are 2 + 3 (less commonly 3 + 3 or 2 + 4). The dorsal scale rows are 21 or 23 at midbody.

9. *Lampropeltis triangulum celenops* Stejneger

Lampropeltis pyrrhomeleana celenops Stejneger, 1903:153. Type-locality, "Mesilla Valley, Dona Ana County, New Mexico." Holotype, National Museum of Natural History (USNM) 22375, an adult male, date of collection unknown, collected by H.B. Lane (examined by author).

Lampropeltis pyromelaena celenops: Stejneger and Barbour, 1917:89.

Lampropeltis doliata celenops: Tanner and Loomis, 1957:15.

Lampropeltis triangulum celenops: Stebbins, 1966:16.

• **Definition.** This subspecies is characterized by having a black and white mottled or occasionally a completely black snout. The remainder of the head is black. The black rings are expanded middorsally, but usually do not cross the red rings. The red rings are interrupted below by black borders on the edge of the ventrals and by a midventral light area. The red and white scales are not black-tipped. The red rings/blotches range in number from 17-25 ($\bar{x}$ = 22.1). Temporals usually are 2 + 3 or 2 + 2. The dorsal scale rows usually are 21 at midbody.

10. *Lampropeltis triangulum conanti* Williams

Lampropeltis triangulum conanti Williams, 1978:189. Type-locality, "Sierra Madre del Sur, vicinity of Chilpancingo, Guerrero, México." Holotype, University of Michigan Museum of Zoology (UMMZ) 85762, an adult male, date of collection unknown, collected by W.W. Brown (examined by author).

• **Definition.** This subspecies is characterized by having a black snout. The remainder of the head is black posterior to a point ranging from the middle to the posterior fifth of the parietals. The chin is usually black. The first black ring begins one and one-half to three scale lengths posterior to the parietals and is incomplete ventrally or narrowly connected across the first ventral. The red scales are not or moderately black-tipped. The white scales are usually black-tipped. The red body rings number from 12-20 ($\bar{x}$ = 16.1). Temporals usually are 2 + 3. The dorsal scale rows usually are 21 at midbody.

11. *Lampropeltis triangulum dixonii* Quinn

Lampropeltis triangulum dixonii Quinn, 1983:127. Type-locality, "4.7 km W Jalpan, Querétaro, México, elevation 625 m." Holotype, TCWC 29504, an adult female collected 27 July 1969 by C.A. Ketchersid (examined by author).

• **Definition.** This subspecies is characterized by having a black snout with the black ending on the posterior half to fourth of the parietals. The red body bands are short, less than 2 scale lengths long. The red and white band scales are not black-tipped. All the red body bands are incomplete ventrally and many are incomplete dorsally. The red body rings range in number from 20-22 ($\bar{x}$ = 20.8). The temporals are 2 + 3 or 3 + 3. The dorsal scale rows are 21 at midbody.

12. *Lampropeltis triangulum elapsoides* Holbrook

Coluber elapsoides Holbrook, 1838:123. Type-locality, "South Carolina and Georgia." Holotype unknown.

Calamaria elapsoides: Holbrook, 1842:119.

Osceola elapsoides: Baird and Girard, 1853:133.

Opibolus doliatus doliatus: Yarrow, 1883:89 (part).

Opibolus doliatus coccineus: Yarrow 1883:90.

Opibolus doliatus elapsoides: Garman, 1883 (1884):65.

Opibolus coccineus: Brimley, 1905:152.

Lampropeltis doliatus coccineus: Wright and Bishop, 1916:142.

Lampropeltis elapsoides: Stejneger and Barbour, 1917:88.

Lampropeltis elapsoides elapsoides: Blanchard, 1920a:2.

Lampropeltis elapsoides virginiana Blanchard, 1920a:2. Type-locality, "Raleigh, North Carolina." Holotype, National Museum of Natural History (USNM) 21163, an adult male collected 16 June 1893 (examined by author).

Lampropeltis triangulum elapsoides: Conant, 1943:7.

Lampropeltis doliata doliata: Klauber, 1948:10.

• **Definition.** This subspecies is characterized by having a red head with a black line across the posterior portion of the parietals. The body pattern consists of rings usually complete across the venter. The red body rings range in number from 12-22 ($\bar{x}$ = 16.1). The red and white scales lack black tips. The temporals usually are 1 + 2. The dorsal scales are in 19 or 17 rows at midbody.

13. *Lampropeltis triangulum gaigeae* Dunn

Lampropeltis triangulum gaigeae Dunn, 1937:9. Type-locality, "Boquete, Chiriqui Province, Panama." Holotype, University of Michigan Museum of Zoology (UMMZ) 57967, an adult male collected 24 March 1924 by H.T. Gaige (examined by author).

Lampropeltis doliata gaigeae: Taylor, 1951:104.

Lampropeltis triangulum gaigeae: Smith, 1958:223.

[*Lampropeltis*]. [*Triangulum*]. *gaigeae*: Frank, 1994:22. *Lapsus*.

• **Definition.** This subspecies is characterized by having a head and body pattern that is gradually obscured by dark pigment ontogenetically. Large adults are uniformly black. Where pattern is still evident, a white band crosses the snout, usually on the prefrontals. The first black ring connects to the black pigment on the head middorsally across the white ring, or begins one to one and one-half scale lengths behind the parietals. The first black ring is broadly complete across the venter, usually on two rows of gulars and the anterior ventral. The red body rings number from 17-22 ($\bar{x}$ = 19.7). The temporals usually are 1 + 2. The dorsal scale rows are 19 at midbody.

14. *Lampropeltis triangulum gentilis* (Baird and Girard)

Opibolus gentilis Baird and Girard, 1853:90. Type-locality, "north fork of the Red River, near Sweetwater Creek, Wheeler County, Texas." Lectotype, National Museum of Natural History (USNM) 1853, designated by Blanchard (1921), an adult male collected on 14 June 1852 by R.B. Marcy (examined by author).

Opibolus gracilis: Hallowell, 1856:247. *Lapsus*.

Opibolus doliatus gentilis: Yarrow, 1883:90 (part).

Coronella gentilis: Boulenger, 1894:201.

Osceola doliata gentilis: Cope, 1900:894.

Lampropeltis doliatus gentilis: Ellis and Henderson, 1913:91.

Lampropeltis triangulum gentilis: Stejneger and Barbour, 1917:90.

• **Definition.** This subspecies is characterized by having a black and white mottled snout. The remainder of the head is black with a few scattered white flecks, especially between the eyes. The red body rings are normally interrupted by black pigment midventrally; some red rings are crossed by black pigment middorsally, especially posteriorly on the body. The red body rings range in number from 20-32 ($\bar{x}$ = 25.6). The temporals normally are 2 + 2 or 2 + 3. The dorsal scales are 21 at midbody.

15. *Lampropeltis triangulum bondurensis* Williams

Lampropeltis triangulum bondurensis Williams, 1978:212. Type-locality, "Cukra, Departamento de Zelaya, Nicaragua." Holotype, American Museum of Natural History (AMNH) 12676, an adult female collected 15 August 1916, collector unknown (examined by author).

• **Definition.** This subspecies is characterized by having a broad, white band on the snout involving the posterior border of internasals and most of prefrontals. The remainder of the head is black to the posterior fourth of the parietals. The first black ring begins one and one-half or more scale lengths posterior to the parietals, the ring usually broadly complete across throat. The red scales lack black pigment or are slightly black-tipped; white scales are slightly to moderately black-tipped. The red body rings number from 13-26 ($\bar{x}$ = 17.1). Temporals usually are 2 + 3. The dorsal scale rows usually are 21-23 at midbody.

16. *Lampropeltis triangulum micropolis* Cope

Lampropeltis micropolis Cope, 1861a:257. Type-locality, "Panama." Holotype, Academy of Natural Sciences of Philadelphia (ANSP) 3427, a young male, date of collection unknown, collected by J.L. Leconte (not examined by author). Dunn (1937) presented adequate reasons for accepting ANSP 3427 as the holotype.

Coronella doliata formosa Jan and Sordelli, 1865:livr. 14, pl. 4, fig. "B". Type-locality unknown. Holotype unknown, not at Vienna as indicated by Blanchard (1921).

Ophibolus micropolis: Cope, 1871:200.

Ophibolus doliatus polyzonus: Cope, 1887:78.

Coronella micropolis: Peracca, 1896:9.

Lampropeltis triangulum micropolis: Dunn and Bailey, 1939:18.

Lampropeltis doliata micropolis: Klauber, 1948:11.

• **Definition.** This subspecies is characterized by having a white snout with narrow black scale margins, usually on anterior and posterior margins. The supralabials usually are white with black posterior margins. The remainder of the head is black to the middle or posterior third of the parietals. The first black ring begins one-half to three scales behind the parietals. The red scales are unmarked to moderately black-tipped. The white scales are heavily black-tipped. The red body rings number from 10-18 ($\bar{x}$ = 13.8). The temporals usually are 1 + 2. The dorsal scales usually are 21 at midbody.

17. *Lampropeltis triangulum multistrata* Kennicott

Lampropeltis multistriata Kennicott, 1861:328. Type-locality, "Fort Lookout, Nebraska," now in Lyman County, South Dakota. Holotype, National Museum of Natural History (USNM) 1842, a young male, date of collection unknown, collected by Lt. Warren and F.V. Hayden (examined by author).

Lampropeltis multistrata: Cope, 1861b:566 (Cope noted that the *multistriata* of the original description is a misprint for *multistrata*).

Ophibolus multistratus: Cope, 1875:36.

Coronella multistrata: Werner, 1929:129.

Lampropeltis doliata multistrata: Tanner and Loomis, 1957:12.

Lampropeltis triangulum multistrata: Stebbins, 1966:161.

[*Lampropeltis*], [*triangulum*], *multistriata*: Frank, 1994:22. *Lapsus*.

• **Definition.** This subspecies is characterized by having a light cream-colored snout mottled with black (occasionally flecked with orange). The head has black pigment on the parietals and the posterior edges of the frontal and supralabials. The first black ring is incomplete, not crossing the venter. The red (or orangish) blotches or incomplete blotches range in number on the body from 22-32 ($\bar{x}$ = 27.1). The midventral surface usually is pale or possesses a few scattered black marks. The overall amount of black pigment on the body is reduced in comparison to adjacent subspecies. The temporals usually are 2 + 3 or 2 + 2. The dorsal scale rows are 21 at midbody.

18. *Lampropeltis triangulum nelsoni* Blanchard

Lampropeltis triangulum nelsoni Blanchard, 1920a:6. Type-locality, "Acambaro, Guanajuato, Mexico." Holotype, National Museum of Natural History (USNM) 46552, an adult male collected in October 1892 by E.W. Nelson (examined by author).

Lampropeltis triangulum schmidti Stuart, 1935a:1. Type-locality, "Tres Marias Islands, Mexico." Holotype, British Museum (BMNH) 81.10.1.97, an adult male, date of collection unknown, collected by Mr. Forrer (examined by author).

Lampropeltis doliatus schmidti: Klauber, 1948:11.

• **Definition.** This subspecies is characterized by having a white snout from mid-prefrontals anteriorly; a small amount of scattered black pigment may be present. The remainder of the head is black. The first black ring usually is more than one scale length posterior to the angle of the jaw, and generally is incomplete or narrowly connected across throat. The red and white scales are not black-tipped. The red body rings range in number from 13-18 ($\bar{x}$ = 16.0). The temporals usually are 2 + 3. The dorsal scale rows are 21 or 23 at midbody.

19. *Lampropeltis triangulum oligozona* Bocourt

Coronella formosa oligozona Bocourt, 1886:614. Type-locality, "Te-

huantepec" and "western slopes of Guatemala." The type-locality was restricted to Tehuantepec by Smith and Taylor (1950). Syntypes, Museum National d'Histoire Naturelle (MNHN) 6083, 4428, 88-126-128 (total of 5 specimens; all examined by author). Williams (1978) designated MNHN 6083, an adult male, as lectotype, date of collection unknown, F. Sumichrast, collector.

Lampropeltis triangulum oligozona: Smith, 1942:201.

Lampropeltis doliata oligozona: Klauber, 1948:11.

• **Definition.** This subspecies is characterized by having a black snout. The remainder of the head is black to the posterior edge of the parietals. The first black ring begins one-half to three scale lengths posterior to the parietals and is complete across the venter, usually on two rows of gular scales. The red and white scales are distinctly black-tipped. The white rings occasionally are almost obliterated by black pigment. The red rings number from 10-16 ($\bar{x}$ = 12.5). Temporals usually are 2 + 3. The dorsal scale rows are 21-23 at midbody.

20. *Lampropeltis triangulum polyzona* Cope

Lampropeltis polyzona Cope, 1861a:258. Type-locality, "Cuatupe, near Jalapa, Veracruz, Mexico." Holotype, Academy of Natural Sciences of Philadelphia (ANSP) 9770, an adult male, date and collector unknown (not examined by author).

Ophibolus polyzona: Cope, 1870:162.

Coronella formosa polyzona: Bocourt, 1886:615.

Ophibolus doliatus polyzonus: Cope, 1887:78 (part).

Coronella micropolis: Boulenger, 1894:205 (part).

Oseola doliata polyzona: Cope, 1896:1023.

Coronella micropolis polyzona: Gadow, 1911:117.

Lampropeltis polyzona polyzona: Stuart, 1935b:32.

Lampropeltis triangulum polyzona: Dunn, 1937:1.

Lampropeltis doliata polyzona: Klauber, 1948:11.

• **Definition.** This subspecies is characterized by having a narrow pale band on the snout, which crosses on or near the prefrontal-internasal border or with white on the first supralabial and posterior segment of the nasal, often extending onto the lateral edge of the prefrontal-internasal margin. The remainder of the head is black. The first four infralabials often are black. The first black ring generally begins on the parietals or not more than one-half scale length posteriorly. A large black blotch or blotches usually occur ventrally in the red rings, but rarely separate them. The red body rings number from 15-25 ($\bar{x}$ = 19.1). The red scales are heavily black-tipped. The white scales are often nearly obscured by black pigment. Temporals usually are 2 + 3. The dorsal scale rows usually are 23 or 21 at midbody.

21. *Lampropeltis triangulum sinaloae* Williams

Lampropeltis triangulum sinaloae Williams, 1978:167. Type-locality, "32.4 miles north of Mazatlan, Sinaloa, Mexico." Holotype, Los Angeles County Museum (LACM) 38529, an adult female collected on 9 July 1962 by R.M. Davis (examined by author).

• **Definition.** This subspecies is characterized by having a black head and snout with varying amounts of white mottling on the rostral, internasals, nasals, and loreals. The first black ring touches the angle of the jaw or is positioned less than one scale length posteriorly. The first black ring crosses the throat, forming a "V." The red rings are complete around the body with only scattered amounts of black pigment ventrally. The red and white bands are not long. The black body rings are two or two and one-half scales long, shortening to one and one-half to two laterally. All the rings are complete around the body. The last two red rings on the tail are obscured by black pigment. The red body rings range from 10-16 ($\bar{x}$ = 12.9) with scattered black pigment midventrally. The red and white scales are not black-tipped. Temporals usually are 2 + 3. The dorsal scale rows usually are 21 at midbody.

22. *Lampropeltis triangulum smithi* Williams

Lampropeltis triangulum smithi Williams, 1978:159. Type-locality, "the Xilitla region, San Luis Potosí, Mexico." Holotype, Louisiana State University Museum of Zoology (LSUMZ) 274, an adult male, purchased on 5 May 1947 by M. Newman from a native collector (examined by author).

• **Definition.** This subspecies is characterized by having a black and white snout, with the anterior portions of the internasals, prefrontals, nasals, loreals, and preoculars white, and the posterior portions black. The supra- and infralabials also have white anterior edges and black posterior edges. The first black ring usually begins on the posterior tip of the parietal or < 1 scale length posteriorly. The red rings are complete around the body, with black pigment usually scattered ventrally. The red body rings number from 19-30 ($\bar{x}$ = 23.8). The red and white scales are moderately black-tipped. The temporals usually are 2 + 3 or 2 + 2. The dorsal scale rows are 21 at midbody.

23. *Lampropeltis triangulum stuarti* Williams

Lampropeltis triangulum stuarti Williams, 1978:217. Type-locality, "Finca Los Cedros (100 m), Tecla, Departamento La Libertad, El Salvador." Holotype, Natur-Museum und Forchungs-Institut "Senckenberg" 43166, an adult female collected on 17 October 1950 by E. Fischer and R. Mertens (examined by author).

• **Definition.** This subspecies is characterized by having a black snout with a narrow, white band usually forming a "V." The remainder of head is black. The first black ring begins at the posterior edge of the parietals or one to two scale lengths posteriorly. The first black ring usually touches the angle of the jaw and is complete across the throat on the gulars and one to two ventrals. The red scales are without black pigment or are slightly black-tipped. The white scales usually are moderately black-tipped. The red body rings number from 19-28 ($\bar{x}$ = 22.8). Temporals usually are 2 + 3. The dorsal scale rows usually are 21 at midbody.

24. *Lampropeltis triangulum sypila* (Cope)

Ophibolus doliatus sypila Cope, 1888:381. Type-locality, "Richland County, Illinois." Holotype, National Museum of Natural History (USNM) 13380, an adult male, date of collection unknown, collected by R. Ridgeway (examined by the author).

Ophibolus doliatus collaris: Cope, 1888:383 (part, one of the syntypes is a *sypila*).

Lampropeltis doliata sypilus: Hay, 1892:516.

Coronella triangulum collaris: Boettger, 1898:72.

Osceola doliata sypila: Cope, 1900:891.

Lampropeltis triangulum sypila: Ruthven, 1919:3.

• **Definition.** This subspecies is characterized by having a red snout and head cap, sometimes with scattered black flecks or with a dark chevron on the posterior edge of the prefrontals. A black band occurs on the posterior portion of the parietals or the parietals may be covered almost entirely with black pigment. A single row of black-bordered red dorsal blotches reaches the first scale row on each side, occasionally reaching the edge of the ventrals. A ventrolateral row of small, alternating blotches may occur on each side, usually involving the first scale row and the edge of the ventrals, when present. The red body blotches range from 16-31 ($\bar{x}$ = 23.1). Temporals usually are 2 + 2 or 2 + 3. The dorsal scale rows usually are 21 at midbody.

25. *Lampropeltis triangulum taylori* Tanner and Loomis

Lampropeltis doliata taylori Tanner and Loomis, 1957:31. Type-locality, "from approximately 2 miles north of Alpine, Utah County, Utah." Holotype, Brigham Young University 10533, an adult female collected 24 May 1951 by W.W. Tanner (examined by author).

Lampropeltis triangulum utabensis: Tanner and Banta, 1966:125. *Lapsus calami*.

Lampropeltis triangulum taylori: Stebbins, 1966:161.

Lampropeltis taylori: Collins, 1991:43.

• **Definition.** This subspecies is characterized by having a black snout or pale snout with black on the medial margins of the prefrontals and internasals. The red rings are separated ventrally by black pigment. The black pigment frequently crosses the red rings middorsally. The red blotches range in number from 23-34 ($\bar{x}$ = 29.1). The temporals normally are 2 + 3 or 2 + 2. The dorsal scale rows normally are 21 at midbody.

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